

## THE GROUND STATE TORSION-ROTATION SPECTRUM OF PROPARGYL ALCOHOL. HCCCH<sub>2</sub>OH

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The ground state torsion-rotation spectrum of the asymmetric internal hydroxyl rotation in propargyl alcohol (HCCCH<sub>2</sub>OH) has been investigated in the 84 to 640 GHz range. The ground state has been confirmed to consist of two torsional sub-states of the gauche conformer<sup>a</sup>, a symmetric *gauche* state (*gauche*+) and an antisymmetric *gauche* state (*gauche*-). No evidence of a low lying third state or *trans* conformer has been observed. The more stable *gauche*+ state is 652389.5 MHz below the *gauche*- state. Due to their close proximity, the two *gauche* states interact strongly through a series of a- and b-type Coriolis interactions. Strong a- and weak b-dipole rotational transitions are observed within each sub-state while strong c-dipole torsional transitions are observed between the two sub-states. Over 2300 transitions covering a range of J and K<sub>a</sub> values to SO and 34, respectively, have been fit to experimental accuracy using a fixed-frame-axis method (FFAM) Hamiltonian. The rotation, distortion and interaction constants have been determined. The 6.52 GHz *gauche*+ - *gauche*- energy difference, strong *gauche*+ to *gauche*- transitions and the constants derived from the analysis should enable rapid astronomical detection.

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<sup>a</sup>Eizi Hirota, *J. Mol. Spectrosc.* **26**, 335 (1968).

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Time required: 15 min

Session in which paper is recommended for presentation: 7